

ABSTRACT

Hyperbranched dendron (HD) polymers are synthesized using low molecular weight polyethyleneimine (BPEI-L) as a core and used for gene delivery. The obtained polymers display low toxicity and efficient gene delivery at low nitrogen-to-phosphate (N/P) ratios. Using successive attachment of ethyleneimine moieties to a PEI core, the polymer has a lower relative ratio of linear-to-branched structures than in the core PEI. The more extensive branching enables the polymer to condense plasmid DNA into nanostructure complexes with a size of less than or equal to about 100 nm. The complexes are stable and efficient in transfecting cells in the presence of serum. Bioluminescent imaging of *in vivo* gene expression using a luciferase reporter gene performed in live mice showed gene expression in the liver and in submandibular lymph nodes.

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